

Frostbite at the gym: a case report of an ice pack burn

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Abstract

The case is reported of a 59 year old woman who suffered a 1% total body surface area superficial partial thickness burn to her calf following the application of an ice pack. The cause, resulting injury, and subsequent management are discussed. It is possible that such injuries are common, but no similar reports were found in a literature search. Awareness of the risk of this type of injury is important for all those entrusted with advising patients on the treatment of minor soft tissue injuries.

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Keywords: skin; burns; ice pack

Case report

A 59 year old woman strained her calf muscles at the gym while running. She was immediately attended to by a member of the gym staff who offered her an ice pack and showed how it should be applied. His erroneous advice was to apply the pack directly to the injured site without any intervening material. For 20 minutes the woman rested the injured limb on the ice pack on a footstool, thus simultaneously compressing and freezing the skin. Over the subsequent 24 hours a large blistered area developed



Figure 2 The healed wound after 10 days of treatment.

on the calf, and on the fourth day after the injury the patient presented at casualty (fig 1). A diagnosis of a superficial partial thickness burn covering 1% total body surface area was made. The initial treatment of this burn was deroofting of its blister. Subsequently the wound was treated conservatively with dressings (vaseline gauze, absorbent gauze, and crêpe dressings), which were changed every second day, until after 10 days the wound had healed (fig 2).

Discussion

Burns from cold exposure are commonly reported in the literature. However, accidental burns from the application of ice packs to soft tissue injuries are not. Dry ice has been reported to cause such an injury,¹ but no report of a standard ice pack causing a burn was found in the literature. Cryotherapy—that is, the application of cold in the treatment of injury or disease—is widely used in the treatment of soft tissue injuries.² As no similar reports were found, it was considered of importance to document this case. The risk of litigation is of significance if such an injury were iatrogenic or the result of the advice given by a gym employee. Rest, ice, compression, and elevation (RICE) are standard treatments for musculoskeletal injuries. Direct application of an ice pack to the skin, without intervening



Figure 1 The injury at presentation, four days after the application of the ice pack.

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material, may cause a burn. All those responsible for the treatment of soft tissue injuries must be aware of the consequences of inappropriate application of an ice pack.

- 1 Gamble WB, Bonnacore ER. Coffee, tea or frostbite? A case report of inflight freezing from dry ice. *Aviat Space Environ Med* 1996;67:880-1.
- 2 Swenson C, Sward L, Karlsson J. Cryotherapy in sports medicine. *Scand J Med Sci Sports* 1996;4:193-200.

An unusual case of thoracic outlet syndrome associated with long distance running

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Abstract

An amateur marathon runner presented with symptoms of thoracic outlet syndrome after long distance running. He complained of numbness on the C8 and T1 dermatome bilaterally. There were also symptoms of heaviness and discomfort of both upper limbs and shoulder girdles. These symptoms could be relieved temporarily by supporting both upper limbs on a rail or shrugging his shoulders. The symptoms and signs would subside spontaneously on resting. An exercise provocative test and instant relief manoeuvre, which are the main diagnostic tests for this unusual case of "dynamic" thoracic outlet syndrome, were introduced.

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Keywords: thoracic outlet syndrome; long distance running; marathon running; upper limbs; shoulder girdle

Case report

A 39 year old male amateur marathon runner presented with sports related numbness and discomfort of both upper limbs and shoulder girdles. The symptoms had been present for three years. He was asymptomatic in normal daily activities and ordinary recreational activities which included badminton and basketball. In 1995, the patient noticed numbness of the left upper limb on the C8 and T1 dermatome after he had run 10 km. The numbness gradually disappeared over the 10 minutes after he had stopped running. In early 1997, he developed bilateral symptoms after a marathon race. The symptoms persisted for two days. Since that episode, the patient had bilateral symptoms on every occasion after running 10 km. The numbness would vanish within 10 seconds if the upper limbs were supported either on a rail or his own iliac crests. The symptoms would return immediately if the support for the upper limbs was removed.

We initially postulated the cause to be hyperventilation or excessive ulnar nerve excursion at the cubital tunnel. The differential diagnosis such as entrapment of the lower brachial plexus could not be excluded.

There was no history of Raynaud's phenomenon, pain, resting numbness, clumsiness, or coldness of the hands. Physical examination gave essentially normal results, including sensation in the four limbs, muscle and hand grip power, reflexes, other neurological examination of the upper limbs, Adson's test, neck tilting test,

Halsted (costoclavicular) test, Wright (hyperabduction) test, Roos' test, and provocative tests for other nerve entrapment syndromes.

An on site physical examination was carried out to document the clinical features immediately after 10 km of running. Two manoeuvres—full extension of both elbows to alleviate entrapment of the ulnar nerve and self controlled ventilation to eliminate factors of hyperventilation—were performed. However, the patient did not show any improvement.

There was diminished touch and pinprick sensation on the C8 and T1 dermatome bilaterally which represented entrapment of the lower brachial plexus. Finally, we discovered that the symptoms and signs would disappear within 10 seconds if both upper limbs were supported on a rail or his iliac crests, or if he shrugged his shoulders.

The x ray picture of the cervical spine was normal. No radiological evidence of cervical rib could be detected. The result of the nerve conduction test was also within the reference range. The F wave and H wave were also normal. No other associated peripheral nerve entrapment could be found. Upper limb dexterity functional assessment and hand grip measurement performed by an occupational therapist was also unremarkable at rest.

The patient was diagnosed to be suffering from strenuous exercise induced thoracic outlet syndrome. To our knowledge, it has not previously been reported in the literature. It is an usual case of thoracic outlet syndrome associated with long distance running.

Discussion

Thoracic outlet syndrome is a well known disease which is due to entrapment of the neurovascular bundle of the upper limbs around the shoulder girdle. It can be classified into arterial, venous, and neurological types of compression.¹ The first two entities are easily diagnosed and there is objective physical documentation¹—for example, an angiogram.² However, the neurological type is vague³ and many cases can only be diagnosed by the history and physical examination. Spiral computed tomography scan of the thoracic outlet is futile for soft tissue compression⁴ because about 70% of the cases involve soft tissue elements only. Magnetic resonance imaging sometimes offers a better delineation of the compression elements. The sensitivity was 79%, the specificity 87.5%, and the false posi-

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